

MEASURES

FOR THE

PREVENTION OF CHOLERA

AMONG EUROPEAN TROOPS

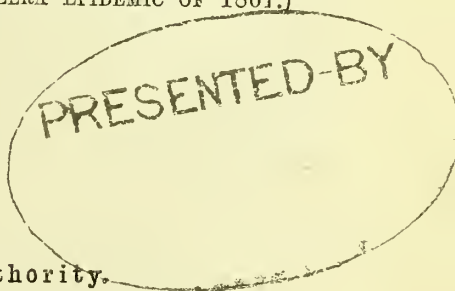
IN

NORTHERN INDIA.

RE-PRINTED FROM THE THIRD SECTION OF THE REPORT OF THE COMMISSION  
APPOINTED TO INQUIRE INTO THE CHOLERA EPIDEMIC OF 1861.)



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## PREFACE.


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The Third Section of the Report of the Commission appointed to enquire into the Cholera Epidemic of 1861, contains a statement of the measures recommended for the prevention of Cholera among the European Troops stationed in Northern India. With a few modifications, proposed by the Sanitary Commission for Bengal, these measures have been sanctioned by the Government of India.

In order that the Rules which have been laid down may be rendered easily accessible in a convenient form, it has been thought desirable that this part of the Report of the Cholera Commission should be separately published. It will form a Manual for the guidance of all Officers in those parts of India to which the Rules have been declared applicable. The grounds upon which the recommendations of the Commission were based are fully explained in the preceding Section of the Report, which is now passing through the Press.

CALCUTTA, }  
April 23rd, 1864. }

JOHN STRACHEY,  
*President of the Sanitary*  
*Commission for Bengal.*



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ORDERS of the Government of India in the Military Department.

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APPENDIX—Memorandum on the propagation and prevention of Asiatic Cholera  
by Dr. W. Budd.

# MEASURES

## FOR THE

# PREVENTION OF CHOLERA

## AMONG EUROPEAN TROOPS

### IN

## NORTHERN INDIA.

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[RE-PRINTED FROM THE THIRD SECTION\* OF THE REPORT OF THE CHOLERA COMMISSION.]

450. We proceed to state the nature of the measures which we believe are the most likely to prove beneficial in future, and which we recommend the Government to carry out.

The Plans which may be adopted for the prevention of Cholera are of two kinds. It has been proved by experience that this, like many other diseases, is in a great degree dependent upon local sanitary conditions for its diffusion. Everything which tends to the improvement of the public health may be expected to have its effect in diminishing the mortality from Cholera. The necessity of measures of this kind cannot be too strongly insisted on. Without wholesome and well ventilated dwellings, good conservancy and drainage, and attention generally to matters of sanitary importance, we must not expect to be able to contend successfully with Cholera. The preceding narrative will have shown how much remains to be done in these respects to render the condition of our Indian Cantonments satisfactory.

451. Measures, however, which are undertaken for the attainment of these objects are not applicable to Cholera alone, nor can it be expected that they can by themselves be sufficient, unless carried out with a completeness far greater than any which we are likely to see. We shall now confine our attention to measures which have a special applicability to Cholera at the present time and under present circumstances. It may be true that, with perfect sanitary arrangements, we should require few special measures of precaution against Cholera, but we are still far distant from any perfe-

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\* Some modifications of the Rules contained in this Section have been proposed by the Sanitary Commission for Bengal, and have been sanctioned by the Government of India. These are now shown as foot-notes, and are distinguished from the original text by inverted commas.



tion of the kind. The difficulties of the practical question with which we have to deal, must not be evaded in the advocacy of general principles, the importance of which cannot be denied, but which at the present time cannot give us the remedy that we require, and of which the observance would be almost equally necessary if no such disease as Cholera existed.

452. Practical measures for the prevention of Cholera can only be founded on the observation and recognition of the facts which the disease ordinarily presents. If this principle be kept constantly in view, and mere theory be carefully avoided, we believe that very much may be accomplished. We do not overstate our opinion when we say that measures may be adopted which will render such mortality among our Soldiers as that which occurred during the late Epidemic at Meean Meer and Gwalior hardly possible for the future.

In the preceding Sections of our Report we have stated all the more important facts which are generally characteristic of Epidemics of Cholera in Northern India, and the conclusions which they appear to authorize. We shall now assume that those facts are correct, and that, without further explanation or argument, we may take them as the basis of our proceedings. We shall recommend nothing which cannot easily be carried into effect, or which does not appear to us essential. If measures of precaution are to be really useful, they must be easy of accomplishment. It is useless to lay down schemes which may be theoretically perfect, but which will break down in practice.

It must be remembered that the measures which we recommend in this Section are only intended to be strictly applicable to places in the North-Western Provinces, Oudh, the Punjab, and any of the adjoining Native States in which European Troops may be stationed.\*

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\* "We recommend that, with the modifications which have now been proposed, the Rules laid down by the Cholera Commission be declared binding upon all Civil, Military, and Medical Authorities at stations for European troops in the North-Western Provinces, Oudh, the Punjab, and in the Central Provinces. The only Stations to which the rules may possibly not always be applicable are those situated in the Hills: with respect to them, the rule proposed in the following paragraph for Stations in Bengal should, we think, be declared to be in force.

"The rules which refer to the removal of troops into Camp, and to the abandonment of buildings which have been attacked by Cholera, were drawn up by the Cholera Commission with special reference to Northern India, and it is possible that they may require some modification in Bengal. We recommend that orders be issued to the effect that the principles laid down by the Cholera Commission with respect to these subjects should be carefully attended to by all the Authorities in Bengal, and that the rules should be acted upon so far as, in the opinion of the principal Medical Officer on the spot, may be practicable. All the other rules which do not refer to the removal of troops into Camp or to the abandonment of buildings, should, we think, be declared to be in force in Bengal.

"The principles laid down by the Commission will be equally applicable to the case of Jails and other public establishments, although the particular rules prescribed will, of course, often be unsuitable."



453. We must start with the conviction that Cholera is an enemy whose attacks are always impending. The outbreak of the disease is often so sudden and so violent that this is essential to success.

Precautions necessary in anticipation of appearance of Cholera.

Every preparation must be made in anticipation of a danger which will infallibly come at one time or other. We have had frequent occasion to notice the fact that while Cholera was raging at places not very distant, nothing authentic was known at many stations of the progress of the disease. Such ignorance is very mischievous. Opportunities are lost for adopting precautionary measures, and people are either left in a false security, or needlessly alarmed by exaggerated reports. Outbreaks of Cholera are seldom altogether simultaneous at different places, and it is of the utmost importance that every station should receive notice of the possible approach of danger.

454. Whenever Cholera shows itself in an apparently epidemic form at a station or in a District in which European Troops are quartered, notice of the fact ought instantly to be sent by telegraph

Military Authorities to send to other stations intelligence regarding outbreak and progress of Cholera.

to the Head Quarters of the neighbouring Divisions of the Army. The Commanding Officer should be held responsible for the strict observance of this standing order. He should also send information from time to time of the progress or cessation of the disease, noticing any facts the knowledge of which may appear likely to be useful at other stations. These Reports may be always made in a few words, and they need give little trouble. All information received by the Military Authorities should be immediately communicated by them to the Chief Civil Authority of the District. He again should transmit the information to the Officers subordinate to him.

455. The Civil Authorities of every Division and District must be held responsible for obtaining immediate

Civil Authorities responsible for giving information of outbreak of Cholera to Military Authorities.

notice of the outbreak of Cholera in their jurisdictions, and for communicating it to the Military Authorities without the least delay. It is perfectly possible at the present time that Cholera may be raging among the Native population within a few miles of a Cantonment of European Troops, and that the fact may be altogether unknown to the Military Authorities. We believe that orders were issued by the Government a few years ago on this point, but little attention has been paid to them.

456. The transmission of information regarding Cholera need cause no alarm. The Reports may, if it be thought necessary, be considered confidential, but we

Advantages of such knowledge.

believe that this will seldom or never be desirable. The knowledge that the attack of the disease is considered possible will be far more likely to produce beneficial than mischievous results, and the belief that the Authorities are alive to the danger, and prepared to meet it, will tend to allay rather than to increase unnecessary alarm.

457. When an outbreak of Cholera appears probable, the Authorities must be prepared for immediate action.

Sanitary precautions.

Every ordinary sanitary precaution must be attended to with increased vigilance; but if proper care be taken at other times, there ought to be comparatively little to do. Want of attention to the conservancy and to the general sanitary condition of a station is inexcusable at all times. It often happens that more harm than good is done by the attempts at improvement made when Cholera has actually appeared. This is not the proper time for emptying offensive drains and cess-pools, and for stirring up possible sources of disease. The utmost care should be taken to prevent over-crowding in the barracks and hospitals. If no buildings to afford additional room can be found, it is better to move some of the men into tents than to permit the least approach to over-crowding at such a time.

458. When the attack of Cholera is thus looked forward to,

Precautionary measures in barracks. measures must be taken for paying the most vigilant attention to the health of the men

in barracks, and for treating there\* all slight cases of diarrhœa or other disease, which, if neglected, might pass into Cholera. The reasons which show this to be a matter of essential importance have been explained in the preceding Section of this Report.† Regarding the manner in which measures for this purpose should be carried out, it will be more convenient that we should speak further on when we consider the system which ought to be adopted in the hospitals during the prevalence of Cholera.

459. If Cholera appears among the Native population in the neighbour-

Communication with infected localities to be prevented.

hood, communication with the infected locality should, as far as possible, be prevented.

The same principal should be acted upon on all occasions during the prevalence of the disease. This is desirable, whether or not Cholera be looked on as contagious or communicable. Frequent communication with places where the disease is prevalent will always be likely to cause alarm, and to produce bad results. We do not mean to recommend attempts to establish a system of quarantine, or to draw a *cordon sanitaire*

\* "After the words 'treating there,' add—'or in Observation Wards entirely separate from the Hospital.'"

† Vide Sec., II, paras. 401 to 416.

round a cantonment or a camp. We desire only to prevent communication which is not essential, and which may possibly be mischievous.

460. One other important precautionary measure must be carried out, in anticipation of the necessity of placing the Troops under canvas, should their removal from Cantonments be required.

Suitable places must be selected beforehand at every station for encampments. During the late Epidemic, it happened almost every where that there was no sufficient information regarding the character of the encamping-grounds that might be made available, or the routes by which they could be reached. The movement of Troops during the rainy season is unusual, and this was doubtless one main reason for the absence of the knowledge which was so urgently required.

461. The existing encamping-grounds which are ordinarily used by Troops on the march, are very commonly situated upon great lines of communication, and will therefore be objectionable. Whether or not we believe that Cholera is communicable by human intercourse, bodies of men supposed to be infected with the disease ought always to be isolated as much as possible. We do not, however, propose absolutely to interdict the use of such encampments. It will sometimes happen that they are the only ones that can be made available, either because no other places in themselves suitable can be found, or because, during the rainy season, they are the only ones easily accessible. But whenever it is possible, ground not in the vicinity of great thoroughfares should be preferred.

We need say little regarding the other points of sanitary importance to be attended to in the choice of ground. So much must depend on local circumstances, that it is best to leave as wide a latitude as possible to the Officers on the spot, who will have to make the actual selection. Inquiry should be made into the previous character of the neighbourhood with regard to liability to Cholera, or exemption from it. The ground should, of course, when possible, be high, with natural facilities for drainage, and with a supply of good water. Although rank vegetation is objectionable, the presence of large trees should be considered advantageous, both because they add to the salubrity of the air, and because their shade will be valuable.

462. The number of encamping-grounds to be chosen at each station must depend upon the number of Troops quartered there. Provisions should be made for the possible encampment at one time of the whole European Force, although we do not anticipate that this will often be necessary.



It will be desirable to reduce the number of men in each camp as much as possible, and occasional change of ground may be required. It will therefore be right to select as many places as, under the circumstances, may be practicable.

463. Four or five miles from the Cantonment is perhaps generally the most desirable distance for encampments; Distance of encamping-grounds from Cantonments. but this must depend upon local circumstances. The ground must be easily accessible to wheeled carriage at all seasons of the year, and it is desirable that communication between the camps should be possible without passing through the station. Removal to a greater distance than we have recommended is not likely to be more beneficial. The difficulties of transport will be increased, and the commanding Officer and the chief Medical Authority will be unable to exercise a constant control and supervision.

464. In the vicinity of almost every station, ground sufficiently good for the purpose can easily be found, and as its No permanent charge anticipated. occupation will seldom be necessary, we anticipate no permanent charge on this account. If at any station no suitable places are really available, ground must be obtained, and compensation must be paid to the proprietors; but we believe that the cases will be extremely rare, if indeed they occur at all, in which this will be necessary. In the first instance some expenditure may occasionally be requisite in clearing the ground, in improving its drainage, or in making it easy of access, but if the ground be judiciously chosen, the charge to Government need be very little.

465. The best situations for these encamping-grounds cannot, in many instances, be determined except during To determine suitability of ground for encampment, observation in the rainy season necessary. the rainy season. It will be at this time of the year that they will be most likely to be required; they must be chosen with special reference to this fact, and it will not always be possible to ascertain satisfactorily, without actual observation during the rains, whether or not a place is really suitable.

466. The approaches to the encamping-grounds that may be selected must always be kept in sufficiently good condition. The expense of this need be very trifling. Approaches to encamping-grounds to be kept in order.

467. Generally speaking, in Northern India, removal from Cantonments will signify removal into tents, and experience seems to show that this is, upon the whole, more likely to be beneficial than removal into other buildings. Buildings suitable for temporary occupation of Troops. When, however, in the vicinity of any station, buildings suitable for

refuges exist, they should not be neglected. The open arcades and halls of old Native buildings afford sometimes excellent quarters. We do not recommend that the Government should incur any large expenditure for improving them, but when at a small charge they can be put into sufficiently good order for the temporary occupation of troops, this should be done.

468. The situation of each encamping-ground or building, and the approaches to it, must be laid down in a Map, and the extent of the accommodation at each place must be carefully recorded, so that the necessary information shall always be available when it is wanted.

Record to be made of situation, &c., of each encamping-ground.

469. On this part of the subject we need say no more. We recommend that the local Governments be requested to carry out the plan that has been suggested in the manner which, with reference to the circumstances of each place, they may consider most desirable.

Detail to be left to the local Governments.

470. It has been suggested by Dr. Murray\* that the extension of Railways in India may add greatly to our means of contending with Cholera by increasing the power of moving men rapidly to a great distance from the place where an Epidemic prevails. Among the possible measures that may be useful in emergencies when every thing else has failed, this ought not to be forgotten. It appears to us, however, to be probable that the removal of Troops, in the manner which we recommend, to places at short distances from the Cantonments, will usually be found quite as beneficial as to places much further off. The reasons for this belief have been fully explained in the preceding Sections of this Report. The Railways may, however, sometimes be extremely valuable in enabling men to be moved without danger from one healthy station to another, through an intervening tract of country infected with Cholera.

471. Although, if the measures we recommended are carried out, the encampment of the whole of the European Force at any station will perhaps not often be necessary at one time, we must nevertheless anticipate this possibility. The ordinary supply of camp equipage will not always be sufficient for these emergencies. The number of tents allowed for each regiment is calculated at the rate of sixteen men per tent, but when beds are put into them, not more than eight men can be accommodated in each.

Supply of camp equipage.

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\* Vide his Report on Epidemic Cholera in Agra, &c., during 1861.

Even if no beds were taken, this number ought hardly to be exceeded. We recommend that the proper authorities be required to report upon the best and most economical way of providing the additional camp equipage required for each station. We believe that the number of tents in store is very large, and it appears probable that a scheme may be devised, which, by differently distributing the existing stock, shall entail little additional expense. The extension of Railways will lessen the necessity of keeping at every station a large supply of additional tents.

472. With regard to carriage, we anticipate no difficulties which need be provided for by any expenditure  
Carriage. beforehand. It will hardly ever happen that

the whole of the Troops at a large station will have to move out of Cantonments on the same day, under the rules which we propose; and if any emergency should occur, we believe that there will be no difficulty in meeting it. In almost every case there will be ample warning to enable arrangements to be made in anticipation of the necessity of moving. The Civil Authorities should be desired to give every assistance in their power in all matters connected with the march of Troops under these circumstances.

473.\* If notwithstanding all precautions, a case of Cholera occur in any building occupied by European Troops, the room or portion of the building in which it occurred must be immediately vacated, and, except for the purpose of purifying it, no one should be allowed to enter it. If the whole building can be left, it

Abandonment of buildings in which Cholera has appeared, and arrangements for accommodation of the inmates.

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\* "*Para 473 to 475.*—Taking into consideration the present state of Barrack accommodation, we think that these three paragraphs may advantageously be modified as follows:—

"473 A. If, notwithstanding all precautions a case of Cholera occur in any building occupied by European troops, the room, or portion of the room or building in which it occurred, should, if possible, be immediately vacated, and except for the purpose of purifying it, no one should be allowed to enter it; if the whole building can be left, it will be still better. This is not laid down as an absolute rule, because sporadic cases of Cholera sometimes occur when there is no reason for anticipating an epidemic outbreak, and under circumstances when the observance of such a rule might cause great inconvenience and probable evil. If, in the opinion of the principal Medical Officer on the spot, there is no reason for supposing either that Cholera in an epidemic form has appeared among the troops, or that an epidemic outbreak is to be anticipated, it will be left to him to determine how far the abandonment of any room or building is necessary. When men are removed from a building supposed to be infected, the best arrangements which under the circumstances are possible, must be made for their accommodation. This is a matter which ought to have been considered before the appearance of the disease and the authorities must be prepared beforehand in this as in all other respects. The men must not be distributed among



will be still better, but it is not necessary to lay this down as an invariable rule, for this might sometimes cause great inconvenience, and worse evils than those which we desire to avoid. The best arrangements which, under the circumstances, are possible, must be made for the accommodation of the men who have been removed from the infected building. This is a matter which ought to have been considered before the appearance of the disease, and the Authorities must be prepared beforehand with their measures in this as in all other respects. The men must not be distributed among the other Troops. So far as may be possible, they must be separated from the men among whom the disease has not shown itself. If no buildings which are entirely separate can be made available, they must go into tents. It must be insisted on that their removal shall lead to no over-crowding either of themselves or of other men.

474.\* When a building or room has thus been vacated on account of the appearance of Cholera, it must be at once thoroughly purified. The walls should be white-washed, the wood-work painted, the floors and all furniture cleaned. The latrines, urinaries, and wash-houses which were used by the man attacked by Cholera and by the other inmates must be closed when the room or building is vacated, and their use must not be permitted until they have been completely purified. The work of cleansing these buildings must be carried out without the least delay, in the most careful manner that can be devised. Chloride of lime, or Condy's Fluid, or other disinfectant, should be freely used. All filth and rubbish from the latrines must be buried at a distance, and all vessels used for their removal must be carefully cleaned at the place where the refuse is deposited.

475.\* If no more cases occur among the men who were in occupation of the building in which Cholera appeared, they may return to it after ten days have elapsed, provided that all the measures of purification have been carried out.

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"the other troops. So far as may be possible, they must be separated from the men among whom the disease has not shown itself. If no buildings which are entirely separate can be made available, it may be desirable that they should go into tents. It must be insisted on that their removal shall lead to no over-crowding either of themselves or of other men. If the principal Medical Officer on the spot should consider that Cholera in an epidemic form has appeared among the troops, or that an epidemic outbreak is to be apprehended, the room or portion of the building in which the disease has shown itself must be immediately vacated, and the rules contained in paragraph 477 and in the succeeding paragraphs will be applicable. In determining whether or not the disease has assumed an epidemic form, the rule contained in the concluding sentence of paragraph 479 will be observed.

"474 A. When any case of Cholera occurs, even though it should be considered to be 'sporadic only, the room in which the disease has shown itself must at once be purified in

\* See note in preceding page.

476. It is doubtless perfectly true that sporadic cases of Cholera often occur, which are not the forerunners of epidemic outbreaks, and that the omission of the precautions which we now advise would often actually lead to no bad results. But it is impossible to draw the line beforehand. Arbitrary rules are essential; those which we have now recommended can always be easily carried out, and their strict observance ought always to be insisted on.

Arbitrary rules essential.

477. If more cases of Cholera occur, this must be looked upon as proof that further precautions are necessary. Measures to be taken if more cases of Cholera occur. The extent to which these precautions must be carried will vary according to circumstances.

We desire to give to the local Authorities every discretion which can safely be left to them, but experience has shown, beyond the possibility of doubt, that this discretion must be limited. It is, on the one hand, certain that if Cholera in an epidemic form attack a body of Troops, there is only one remedy in which confidence can be placed,—removal from the infected locality.\* On the other hand, it is clear that the application of this principle requires care and judgment. To send men unnecessarily away from their Cantonments into camp, at perhaps the hottest and most unhealthy season of the year, is, on many grounds, seriously objectionable.

The question whether such a measure is or is not necessary must turn upon the point whether there is or is not reason to believe that Cholera has appeared among the men in an epidemic form. To determine this will not always be easy, the actual symptoms of sporadic cases being usually the same as those which usher in an epidemic outbreak. The practical difference between the two forms of the disease is, neverthe-

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“ the manner described in paragraph 492. The latrine, urinary, and wash-house used by the man who was attacked, should be instantly closed, and their use must not be permitted until they have been completely purified. The work of cleansing these buildings must be carried out without the least delay, in the most careful manner that can be devised. Chloride of Lime, or Condy's Fluid, or other disinfectant, should be freely used. All filth and rubbish from the latrines must be buried at a distance, and all vessels used for their removal must be carefully cleaned at the place where the refuse is deposited.

“ 475 A. If the principal Medical Officer on the spot has determined that the cases of Cholera which have occurred were sporadic, it will be left to him to decide how soon the men who may have been removed from the room or building in which the disease appeared shall be allowed to return to it. If the cases have been determined to be epidemic, the rules laid down in paragraph 477 and in the subsequent paragraphs will be applicable.”

\* Vide Sec. II, paras. 431 to 448.

less, so far as our present objects are concerned, a real one, and the difficulty of making the distinction will generally be much reduced if immediate intelligence regarding the appearance and progress of the disease be systematically sent, as we have proposed, from every station. When there is any unusual prevalence of Cholera in neighbouring parts of the country, or diarrhoea is common in the station, it will be generally prudent to assume the epidemic character of the disease.

478. The decision of this question must rest with the principal Medical Officer on the spot. If he be of opinion that the cases that have occurred are in all probability sporadic, and that no cause is apparent for supposing them to be epidemic, removal from Cantonments need not take place.

479. It must be distinctly understood that it is only upon the grounds which we have now stated that the question of the necessity for the removal of the men into camp can be discussed. If it

If Cholera appear epidemically, men among whom the disease has shown itself to go into camp. be admitted by the principal Medical Officer that there is reason for apprehending an epidemic outbreak, no option will then remain; the men among whom Cholera has appeared must immediately be sent into camp. This must be laid down as a positive standing order, under which no choice of action exists, which must be carried out under all circumstances, whatever be the state of the weather, or whatever other objections may be made. Further, to obviate the possibility of this most important measure being improperly delayed by any peculiar views regarding the epidemic character of the disease, it must be ordered that if within one week after the first case of Cholera two or more other cases occur, it shall be considered that the disease has assumed an epidemic form, and the men must be removed accordingly.

480. In determining to what extent the removal of the Troops is necessary from a station in which Cholera has appeared, we must again leave a certain discretion to the local Authorities. It is not always necessary, or advisable, that the whole

Discretion left to local Authorities to determine extent to which removal into camp is necessary. of the Troops should be sent into camp when Cholera, even in a form admitted to be epidemic, has shown itself in a station. The principle upon which the necessity for removal rests is, that Cholera evidently attaches itself to particular localities. The same facts which show this to be true, prove that even during the most violent epidemics, there is not necessarily any general cause in operation which renders all person in the neighbourhood of the places that have been attacked specially liable



to the disease. It frequently happens, as we have already shown, that while one part of a station suffers severely, another part escapes altogether. The principle to be borne in mind is, therefore, this, that the particular locality in which Cholera shows itself must be looked upon as dangerous; that it must be immediately abandoned, and all communication with it stopped; and that the men who have been exposed to danger by their occupation of the place in which the cause of the disease is presumed to be present, must be separated from the rest of the Troops. The constant tendency of Cholera is to localize itself in particular places, and among particular bodies of men, and every effort must be made to turn this fact to useful account.

481. All, therefore, that need be laid down as an invariable rule is that the particular body of men among whom Cholera has appeared in an epidemic form must be removed from the Cantonments. If, for example, this body consist only of the inmates of some one building,\* the measure need only be applied to them, if some particular Company or Troop be attacked, it will be similarly dealt with. A whole Regiment or the whole of the Troops at the station, need only be sent into camp when it is found that the measures already adopted have not stopped the progress of the disease, or there is reason to fear that they will be insufficient.

482. It does not follow, because the local Authorities must not do less than we prescribe, that they may not do more. The precautions which we advise are those that appear essential in all cases, and we believe that they will ordinarily be sufficient. But it may happen that an outbreak of Cholera commences virulently; that cases occur in rapid succession among different bodies of men in various parts of the Cantonment; or that for some other reason there is cause for apprehending that the disease may become generally prevalent. Under such circumstances, the minimum of precaution that we prescribe may not be enough, and it may become the duty of the Military and Medical Authorities to take vigorous measures for the immediate removal of the whole of the Troops, including those among whom no cases of Cholera have actually occurred.

483. The rules that have now been proposed, as well as those which follow, are equally applicable to the women and children, if Cholera should appear in their quarters.

Rules applicable to women and children.

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\* "For the word 'building,' substitute 'room or building'."

484. Preparation for moving the whole of the Troops, if necessary,  
 Preparations for moving into camp to be made beforehand. into camp ought to be made directly ; there is reason to suppose that Epidemic Cholera has appeared, or that its attack is imminent. Every thing must, as far as possible, be considered beforehand, so that when the necessity occurs, there may be no doubt regarding the course to be pursued, and no reason for delay. Discretion will be required as to the proper encamping-ground to be chosen. The vicinity of places in which Cholera is prevalent will, of course, be avoided.

485. If the weather be wet, cots should be taken into camp for all the men, so that there may be no necessity for their sleeping on damp ground.  
 Cots to be taken into camp.

486. Marches should always be short. It is of the utmost importance that unnecessary fatigue and exposure should be avoided, and everything possible should be done to keep the men cheerful and in good spirits.  
 Marches to be short.

487. Immediate apparent benefit is not always to be expected from the movement into camp. It is clear that men often take with them the seeds of Cholera, and although the immediate cessation of the disease is by no means uncommon, it is unreasonable to suppose that this will always be the case. Even if the first apparent result be an aggravation of the disease, this need cause no discouragement. It ought to be considered that, in all probability, the virulence of the disease would have been greater if the men had remained in their barracks.  
 Immediate benefit from change not always to be expected.

488. We do not advocate the regular periodical removal of the camps under all circumstances. We think that on the arrival at the first camp, there should generally be a halt of three or four days. If there are no fresh cases, or very few, there is no necessity for further marching, provided that the arrangements for the conservancy of the camp are carried out in a thoroughly efficient manner. Change of ground may generally be made without moving to a distance. These are matters which must be decided at the time according to circumstances. If the disease continue to be virulent for more than three or four days, the Troops should move.  
 Removal of camps.

489. The strictest possible attention must be paid to the conservancy of the camps.  
 Conservancy of camps.

The system usually adopted for latrines in camp is, with proper management, entirely satisfactory. Trenches should be dug to leeward,

and tents pitched over them, and all filth should be instantly covered with earth. With proper care nothing offensive need be perceptible.

A similar system should be adopted for the camp-followers and other Natives. The strictest regulations must be laid down and enforced by the Commanding Officer, to ensure attention to this generally neglected matter.

490. Wells should be cleaned, and the water drawn off, whenever they have not been in constant use. The utmost attention must be paid to the quality of the drinking-water. At encamping-grounds which have been frequently used, and which are situated upon great thoroughfares, caution will be especially necessary. It will often be desirable to sink temporary wells, so that there may be no danger of water contaminated by organic matter being supplied to the Troops. This will, generally speaking, be easy, and the expense will be very trifling.

In Cantonments also, this is a precaution which, during the prevalence of Cholera, it may often be desirable to adopt, for, as we have stated already, the quality of the water in our Military stations must sometimes be looked upon with great suspicion, and the evidence can hardly be doubted which has been collected to show that the drinking-water is at least one means by which the disease is occasionally diffused.\*

491.† It not unfrequently happens that Troops are allowed to return to Cantonments far too soon, and the consequence is the re-appearance or aggravation of the disease. There must be an absolute prohibition against returning to Cantonments, under any circumstances, until at least ten days have elapsed after the disappearance of Cholera from the station, and until every measure for the purification of the buildings has been

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\* "Add to this paragraph the following words taken from the Memorandum by Dr. Budd, printed in the Appendix :—'When any doubt exists as to the quality of the drinking water, it should be boiled and filtered through charcoal before use.'

† Para. 491.—We propose to alter this paragraph as follows :—

491A. "It not unfrequently happens that troops are allowed to return far too soon to Cantonments, or to buildings which have been attacked by Cholera, and the consequence is the re-appearance or aggravation of the disease. The return to Cantonments must only be allowed with the greatest caution. No part of the Cantonment from which the disease has not altogether disappeared should be re-occupied. Under no circumstances can the re-occupation of any building which has been attacked by Epidemic Cholera be allowed, unless at least ten days have elapsed since the last case of Cholera in the building, nor until every measure for the purification of the building has been carried out. The prevalence of fever or other diseases in camp is no reason for returning to Cantonments while danger from Cholera remains. It must be accepted as the lesser evil of the two."



carried out. The prevalence of fever or other diseases in camp is no reason for returning. It must be accepted as the lesser evil of the two.

492. When Troops are sent into camp, all the buildings occupied by them in Cantonments should be thoroughly purified without the least delay. The Purification of buildings. walls, floors and punkahs should be scraped and lime-washed ; the wood-work should be painted ; furniture, punkah fringes, and ropes washed, and generally everything possible done for the complete purification of every building. Special care should be devoted to cleaning the latrines, urinaries, and wash-houses. Chemical disinfectants should be freely used. Until the purification of the buildings is complete, the Troops should, under no circumstances, be allowed to re-occupy them.

493. Communication should be stopped, as far as possible, between the camps and Cantonments, or other places supposed to be infected with the disease. Communication with infected places to be stopped. The hospitals in particular should be isolated to as great an extent as may be practicable.

494. The question of hospital management during the prevalence of Cholera is one of urgent importance. Hospital management. The present Report shows to what a terrible extent during the late Epidemic, the hospitals became the sources and foci of disease, and no measures of precaution are more necessary than those which may prevent the repetition of such lamentable occurrences.

In carrying into effect the measures which we are about to propose, the principles upon which they are founded must be constantly borne in mind. These have been fully explained in the preceding Section of our Report.\*

495. We have shown that the existing system of treatment in hospitals is entirely inapplicable during Epidemics of Cholera ; that its result is the aggravation of the disease by creating and fostering the very conditions which ought to be avoided, and that in consequence of the dread with which the men necessarily and rightly look upon the hospitals, they receive no Medical treatment in the only stage of the disease in which Medicine is of much value. The concentration and accumulation of men in the hospitals leads to the most fatal consequences. This is a fact which must be accepted, and whether we agree or not regarding the manner of accounting for it.

Fatal results during Cholera Epidemic of existing system of hospital treatment.

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\* Vide Sec. II, paras. 401 to 416, and 424.

496. Precautionary measures in the hospitals must be commenced,

Precautionary measures in hospitals before the appearance of Cholera.

whenever it may be possible, before the actual appearance of the disease. We have already noticed the necessity of vigilant attention to

the health of men in barracks, when the attack of Epidemic Cholera is supposed to be impending. All slight symptoms of disease must be treated in the barracks, or in other buildings, without compelling the men to remain in the hospital.\*

497. We need say little regarding the exact manner in which this

Details left to discretion of Officers on the spot.

system should be carried out. All details must be left to the discretion of the Surgeon

of the Regiment and the Commanding Officer. If the duty be gone through in a perfunctory manner, it will fail. The men will themselves give every assistance if they feel that the measures which are taken have been prompted by an anxiety for their good, and if they find that the practical result is beneficial. A Medical Officer can hardly give a better proof of his efficiency than by showing himself able to carry out successfully these measures of precaution. He may do much in the way of prevention ; in the way of cure, after prevention has failed, he can do little.†

498. In the hospitals themselves, the utmost vigilance is this time

Vigilance required in hospitals.

necessary. No sanitary precaution must for a moment be neglected ; no approach to anything

like crowding must be permitted ; all unimportant cases, the treatment of which in hospital is not essential, should be discharged. Every case in the hospital should be carefully watched, and the Surgeon must never lose sight of the fact that in very numerous instances it is in the hospital, among patients under treatment for other diseases, that Cholera first appears.

499. If no separate building can be set apart as a temporary

Separate temporary hospital to be prepared for Cholera cases.

hospital, tent should be pitched for the purpose in some convenient place at a little

distance. Every arrangement must be made, so that if a case of Cholera should occur, it may be immediately removed there, and not be treated in the regular hospital. Medicines and every thing considered requisite for the treatment of the disease, should be prepared in the temporary hospital, and a portion of the Establishment should be

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\* " Add to this paragraph :—

" When other buildings entirely separate from the hospital can be made available, they should be used for this purpose as Observation Wards."

† Vide pages 133 to 140.

kept in readiness to be transferred there. Thus, if a case of Cholera occur, the means will exist for separate treatment, and subsequent frequent communication with the regular hospital will be unnecessary.

500. If, notwithstanding all precautions, Cholera should appear in an epidemic form, the system of inspection and precaution in barracks must be carried out with redoubled vigilance. The Medical Officers should devote their whole time and attention to efforts for the prevention of Cholera. Trifling cases of ordinary disease ought at such times to be considered of very little importance. They should receive a palliative treatment in barracks or in camp. It is far better that they should receive no treatment at all than that they should be admitted into hospital.

501. No patient attacked by Cholera should ever, under any circumstances, be placed in the same ward with patients suffering from other diseases. This invariable rule should equally apply to sporadic cases of Cholera. Room must be found, either in the hospital itself, or in some other building, or, if this is impossible, in a tent. Even if we put aside all other reasons, the cruelty of bringing into the midst of the sick a patient suffering from a disease with symptoms so terrible as those of Cholera, cannot be too severely reprobated.

502.\* If a patient in a Regimental Hospital suffering from another disease be attacked with Cholera, or if a case occur among the hospital attendants or others, under circumstances which render it probable that the Cholera had its origin in the hospital, the same system must be adopted which has been prescribed in the case of Cholera appearing in other buildings occupied by the Troops. The ward in which the case occurred should not be re-occupied during the prevalence of the Epidemic. If more cases occur, the hospital buildings should either be abandoned

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\* "Para. 502.—This paragraph requires to be modified, so that it may correspond with the rules proposed in the new paragraphs 473A, 474 and 475A. We propose to alter it as follows:—

"502 A. If a patient in a Regimental Hospital suffering from another disease be attacked with Cholera, or if a case occur among the hospital attendants or others, under circumstances which render it probable that the Cholera had its origin in the hospital, the same system must be adopted which has been prescribed in the event of Cholera appearing in other buildings occupied by the troops. (Para. 473 A *et seq.*) When Epidemic Cholera has thus attacked a hospital, the ward in which the disease has shown itself must be immediately abandoned, and every precaution laid down with respect to other buildings must be taken. It is left to the senior Medical Officer on the spot to determine, subject to the conditions contained in paragraph 504, to what extent patients in a hospital which has been attacked by Epidemic Cholera should be removed into Camp."

altogether, or reserved for the reception of patients in the advanced stage of Cholera, whose recovery is considered hopeless.

503. For the treatment of patients suffering from Cholera, we believe that tents are unobjectionable at all seasons of the year. They have, indeed, some important advantages. It is difficult, even, with the utmost care, to keep a Cholera ward in a satisfactory sanitary condition; the air in a tent is less likely to become contaminated, and the ground can be changed as often as may be desirable.

504. When Troops are sent into camp on account of an outbreak of Cholera, all ordinary sick capable of being removed without evident danger should go into camp also. Separate hospitals should always be organized in the camps, and under no circumstances should patients be brought for treatment from the camps to the hospital in Cantonments.

505. If the plans that have been recommended are properly carried out, it will probably not often be necessary to send the whole of the Force to be broken up as much as possible. Troops into camp at once. When, however, this is essential, the force should be broken up into as many separate detachments as may, under the circumstances, be practicable, and a separate Hospital Establishment assigned to each party. When the Troops are sent out in detachments from time to time, they should, in the same way, be kept, as far as possible, separate from each other.

506. If, in spite of every effort, the sub-division of Hospital Establishment should lead to difficulty in the medical treatment of the disease, this must be accepted as the lesser of two evils. The difficulty of affording medical treatment to patients suffering from Cholera cannot be admitted as a reason for omitting to carry out precautionary measures. It must always be borne in mind that the main object during an Epidemic of Cholera is the prevention of fresh cases, much more than the medical treatment of those who have already been attacked; that prevention is often possible, but that treatment is almost useless after virulent symptoms have appeared.\*

507. The principal Medical and Military Authorities appear already to possess sufficient power of increasing Temporary increase of Establishment. Establishments on the occurrence of emergencies, and of transferring Medical Officers and Hospital Subor-

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\* Vide Sec. II, paras. 425, 426 and 537.



dinates from one station to another. They should be encouraged to take upon themselves without hesitation all such responsibility. They should at the same time remember that every man who is needlessly sent to do duty in a hospital helps to aggravate the evil.

508. We recommend no permanent increase to existing Hospital

Establishments, but it is very necessary that the number both of Medical Officers to be maintained.

Officers and of Hospital Subordinates should never be allowed to fall below the authorized strength. Under the system which we propose, we believe that a violent outbreak of Cholera will not very often occur without previous warning, and, while no Cholera is present, attention should constantly be directed to the possibility of its appearance. We repeat that the foundation of all useful measures is the conviction of the Authorities at every station that they may at any moment be called upon to meet the attack of Cholera. To enable them to do this properly, a sufficient Medical Staff must always be available.

509. During the prevalence of Epidemic Cholera, no Medical or

other Officers should ordinarily be allowed leave of absence, except on medical certificate.

Leave of absence not to be granted during Epidemic of Cholera.

510. The facts stated in the preceding Sections of our Report

show the extreme danger of the system under which European Soldiers are

Danger of employing European Soldiers on hospital duty.

employed, during the prevalence of Cholera, as Orderlies in attendance upon the sick in hospital. It has been proved by experience that this duty can be performed by Natives thoroughly well, and that they are far less liable than European Soldiers to be attacked by Cholera. It has been found that the Soldiers themselves feel no dislike whatever to be attended by Natives. The most difficult part of the duty usually to be performed, the application, during painful cramps, of friction and shampooing, is indeed one which Natives understand much better than Europeans.

There will seldom be any real difficulty in obtaining Native servants

for this work. The class employed as attendance on Cholera patients. ward coolies are generally willing and

competent to undertake it. These men receive Rs. 4 and sometimes Rs. 5 per mensem. Something may with advantage be done to improve the position of this class of servants. Additional pay should at least be given to them during the prevalence of an Epidemic, in consideration of the additional duty they are called upon to perform, and to encourage others to come forward during the pressure of an emergency.

An Epidemic of Cholera seldom lasts in a virulent form for any considerable time, and looking upon the question merely as one of economy, it would be far cheaper, to pay each Native servant 50 Rupees a month than to expose European Soldiers to this dangerous duty. The employment of Natives in the manner that we recommend is in operation in the General Hospital at Allahabad, and it has been successfully practised in many other places. A certain amount of European superintendence will, of course, be necessary. If the Officers who have to supervise the execution of the plan be men possessing some Indian experience, and knowledge of the people and of their language, it seldom be found difficult to carry it into effect.

511. The employment of European Soldiers as Orderlies in hospitals during the prevalence of Cholera should be strongly discountenanced.

Employment of European Soldiers in hospitals to be discountenanced. Although we are not prepared to say that the practice can at present be absolutely prohibited, it ought only to be permitted under very exceptional circumstances, and every effort should be made for its complete abolition. We look upon this as a matter of the greatest importance.\*

Female nurses for attendance on women and children.

512. For attendance on women and children suffering from Cholera, Native female nurses should, if possible, be obtained.

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\* "The whole subject of hospital attendance and nursing in India requires consideration. Many changes are doubtless necessary. Pending the introduction of a better system, we recommend the addition of the following rules to paragraph 511. They will protect the men against excessive fatigue and exposure while unavoidably employed as hospital orderlies :—

"When the employment of European Soldiers as orderlies in hospitals during the prevalence of Cholera is considered unavoidable, men will be selected from the regiment, as far as possible by volunteering, in such numbers as the Medical Officer in charge, in communication with the senior Medical Officer on the spot, shall deem necessary. No man who is not in good health shall be thus employed. The complete tour of duty shall in no case exceed twenty-four hours. No orderly shall be kept in actual attendance in the hospital for a longer period than four hours at one time, nor shall he have a less interval of rest than six hours between successive tours of duty, whatever be the period of attendance in the ward. A room entirely separate from the hospital buildings must be provided for the accommodation of men relieved from attendance on the sick, in which they can remain until their tour of duty again comes round. Men not upon actual duty are not to be allowed to remain in the hospital. The strictest precautions must be taken to prevent men employed in the hospital from making use of the latrines, urinaries, or wash-houses used by the sick in hospital. The utmost care must be taken that the hands of all attendants on Cholera patients be scrupulously cleaned, by means of sand and water containing some disinfectant, or other thoroughly efficacious means, and that if the clothes of any of the men should become soiled by Cholera discharges, they be at once taken off and thoroughly purified. Every man employed as a hospital orderly on attendance upon Cholera patients shall be provided with tea or coffee before and after each tour of duty."



513. Difficulties which arise from insufficiency in the number of Medical Officers, or Hospital Establish-

Insufficiency of Hospital Establishments may be often supplied by economy of existing means.

ments, may sometimes be greatly diminished if the available resources are properly economised. We have observed cases which occurred during the late Epidemic, in which much embarrassment might have been avoided by the better application of the existing means. Thus, for example, if a Regiment is sent into camp on account of the outbreak of Cholera, and there should be a few patients who cannot possibly be moved, there is no necessity for wasting available resources by leaving a separate Regimental Hospital Establishment for them in the Cantonments. The sick should, under such circumstances, be transferred to another hospital. When a station is abandoned altogether, one small general Hospital will usually be sufficient for all the patients who must remain in the Cantonments.

514. In proceeding to speak of the necessity of measures for the preservation of cleanliness, it must be noticed that many eminent Authorities believe that Cholera may be disseminated by the discharges from patients suffering from the disease.

We are indebted to Dr. Budd, who has been the principal advocate of this belief, for an interesting paper, in which he has communicated to our Commission his views upon the propagation and prevention of Cholera.\* We desire especially to invite attention to the plan which he proposes for arresting Cholera among Troops in infected barracks. Regarding the propriety of the measures of precaution which Dr. Budd advises, we think there can be no question. Whether the theory be true or not, the scrupulous cleanliness upon which it insists must always be beneficial.

515. We think that while carrying out, during the prevalence of Cholera, measures for the preservation of cleanliness, in the necessity of which every one will agree, it will be prudent to admit the possibility that the discharges from Cholera patients may have especially poisonous properties, and that efforts should be made to destroy those properties by means of chemical disinfectants immediately on the issue of the discharges from

the body.\* In proposing the following measures, we have drawn largely upon Dr. Budd's Memorandum, and we desire to express our high sense of the value of the assistance which his recommendations have afforded us.

Independently of these reasons, the use of chemical disinfectants, during the prevalence of epidemic and contagious diseases, is a precaution which should never be neglected. There is doubtless much truth in the objections which have been made to the employment of disinfectants and of deodorizing preparations during ordinary circumstances. They serve to conceal impurities which ought not to be allowed to arise, and which can be prevented by proper care and cleanliness. During the presence of epidemic disease, there is less danger that they will be suffered to become a substitute for other precautions, instead of being as they should be, an addition to them.

During seasons when Cholera prevails, chemical disinfectants should be freely used in all the latrines provided for the Troops, in Cantonments and in camp, and on all occasions on which their employment is indicated.

516. The utmost care should be taken for the immediate removal of all Cholera excreta. The vessels in which they are received should contain some powerful disinfectant. They should never be emptied into the usual receptacle, or carried to the common latrine, but taken away separately, and the contents thrown into a trench dug for the purpose and reserved for this use. A man should be constantly employed in the duty of throwing fresh earth over all filth the moment it is deposited. This trench need not be distant. It is better that it should even be in the hospital enclosure, than that any accumulation of filth should be permitted, and, if it be too distant, there will always be a probability that the sweepers, to save themselves trouble, will not carry the vessels to the places assigned. The vessels should be thoroughly cleaned at the trench into which the filth is thrown. There need be nothing at all objectionable or offensive in a trench such as that which we recommend. The number of sweepers should be increased, if necessary, so that there may be no excuse for the neglect of this very important matter. The same plan should be adopted in camp.

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\* The best disinfectants that can be used are probably Chloride of Lime, or Condyl's Fluid (Permanganate of Potash). The latter possesses the great advantage of having none of the disagreeable smell or objectionable properties which sometimes seriously interfere with the usefulness of the former. For the purposes that are especially required during an Epidemic of Cholera, Condyl's Fluid possesses great advantages. As a mere deodorizer, it is in some respects less efficacious than other compounds, because it has no power of preventing decomposition. For the latter purpose, Chloride of Zinc (Burnett's Fluid) and Carbolic Acid (McDougall's Powder) are very efficient. The alkaline manganates and permanganates, on the other hand, are oxidizing agents, which actually destroy the offensive organic substances, and they are therefore especially valuable when the object is not to prevent decay, but to get rid altogether of the products of existing decomposition.

517. Every effort should be made, during the actual treatment of

the disease, to get rid, as completely as possible, of all the discharges from the sick, or to render them innocuous. Attention to proper precautions on the part of the attendants must be enforced. Unless strict supervision be exercised the sweepers and other Native servants will certainly disregard all the rules that may be laid down.\*

518. All bedding and clothing used by Cholera patient should be instantly burned. The present system,

under which a mass of filthy clothing is often carefully stored up until it can be condemned by a Committee, is most objectionable and dangerous. We have ourselves, on more than one occasion, found these accumulations of bedding, and clothing, several months after Cholera had disappeared, collected together in the same room in which the regular supplies for the hospital were kept. Beds that have been occupied by Cholera patients should be immediately taken to pieces, the wood washed and painted, and the Newar, or plaited tape sacking, should be burned.

519. The arrangements for the removal of the sick from the barracks to the hospital are often very insuffi-

cient. We have frequently found that the dooly employed for this purpose has been also made use of for the removal of the dead. Where no hearse has been supplied, separate means ought always to be provided for carrying the dead to the burial ground.

520. During the prevalence of Cholera funeral parties should be discontinued, and the band should attend at

no funerals, either of Officers or Men. This rule has usually been followed, but not invariably, and more than one case has been mentioned to us of the bad results produced by the melancholy music of the dead march sounding day after day through a station.

521. We need hardly say that special attention should be paid, during the prevalence of Cholera, to every-

thing which can tend to the improvement of the general health of the men.

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\* "Add to this paragraph the following words :—

"All discharges from the sick, including, those vomited, should be received on their issue from the body, in vessels containing a saturated solution of some powerful disinfectant. The rules laid down in paragraph 511, for preventing the use of the hospital latrines, urinaries, and wash-houses by Soldiers employed as hospital orderlies, and for ensuring personal cleanliness, will be equally applicable to all other attendants upon the sick. (Vide foot note, para. 511.)"



Every effort should be made to relieve them from duties which cause needless exposure and fatigue; to ensure that their food is wholesome, and their clothing appropriate, and to promote every means of healthy amusement and occupation. Example will be found in this Report of the benefit apparently derived during an Epidemic of Cholera from a well organized system, such as exists in some Regiments, for improving not only the physical but the moral and intellectual condition of the men. Such measures as these must be carried out perseveringly and constantly at all times; they cannot be suddenly adopted during the prevalence of an Epidemic, but their extreme value will then be found.

522. There are many articles of diet which can now only be obtained in hospital. These comforts, as they are called, should be freely supplied in the barracks during the prevalence of Cholera, whenever the Surgeon and Commanding Officer think proper. This is more particularly desirable for the women and children, to whom these little extras will be especially valuable. Even should the indulgence be abused, little harm will be done. An Epidemic of Cholera does not last long, and the cost to Government will be very trifling.

523. Definite rules are required regarding the preparation of Returns of Cholera cases. Some Medical Officers, during the prevalence of an Epidemic look upon almost every case of diarrhœa as one of Cholera in the incipient stage, and record it as such. Others call nothing Cholera unless there are unmistakeable and dangerous symptoms of the disease. The result is, that the Returns from one place are not fairly comparable with those of another. It may easily happen, that a system of treatment, which is shown by the Returns to have been peculiarly successful, has in reality completely failed.

No cases should be returned as Cholera unless certain symptoms are present. An arbitrary line must be drawn. At the same time it is important that a distinct record should be kept of cases of diarrhœa or of other diseases which appear to be in any way connected with the prevalent Epidemic.

The introduction of a uniform system is desirable, that shall be applicable not only to India but to England and the Colonies also. We recommend that the attention of the principal Medical Authorities be drawn to the subject, in order that appropriate rules may be laid down.

524. In concluding this Report, we desire again to notice the necessity of measures for the gradual removal of the ignorance which now prevails regarding almost every matter of sanitary import-

Necessity for organizing a proper system of sanitary administration.

ance in India. So long as this ignorance remains, it is useless to hope that measures for the prevention of Cholera or of disease generally among our European Soldiers can have any sort of completeness. Up to the present time, we have hardly made a beginning in laying even the foundations of true sanitary knowledge. We require the registration of deaths; the observation, on a regular and uniform plan, of meteorological phenomena; the record of facts to show the nature of the relations which exist between variations of climate and season; the rates of mortality, and the prevalence of disease; and generally the systematic accumulation of knowledge regarding matters that affect the public health.

At the present time we know almost nothing regarding the real sanitary conditions even of the places at which our European Troops have been stationed for a long series of years. There hardly exists, as we have already noticed,\* a satisfactory account of the climate of a single place in the whole of Northern India. The principles upon which our barracks and hospitals should be constructed, or our plans of conservancy carried out, remain doubtful and undecided. If we wish to ascertain a matter so apparently simple as that of the comparative healthiness of various Cantonments, we find it scarcely possible to come to any conclusion, so obviously deceptive and full of error are all the available data. Regarding the effect of climate and of other causes on mortality and disease among the Native population, we know literally nothing.

The first thing that we require is, therefore, the means of obtaining some insight into the laws upon which public health in India depends.

It is not in this branch of the subject alone that comprehensive views are necessary. If we desire to render the sanitary condition of our European Soldiers really satisfactory, we must not, when we come to practical measures of improvement, ignore, as we have hitherto done, the existence of the masses of Native population in the midst of which our Soldiers must generally live. It is hopeless to expect that we can guard against the attacks of epidemic disease by any amount of care in our Cantonments, if every sanitary precaution is neglected in the Native cities and towns close by. For practical purposes we may consider that in this respect up to the present time nothing has been done at all. Here and there an active Magistrate carries into effect some not unimportant measure of sanitary improvement, but its benefits seldom continue for any length of time. It happens, as often as not, that his successor takes no interest in such matters, and allows everything to revert to its original state. So it is in our cantonments. Some Commanding Officers

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\* Vide Sec. II., para. 335.

show themselves to be fully aware of the importance of measures for the prevention of disease; others, perhaps in the same station and at the same time, look with indifference upon everything of the kind. Notwithstanding the extraordinary progress which Sanitary Science has lately made in England, public education in this respect remains generally at a very low ebb. We have passed the time in which people venture to deny the importance of these questions, but there is not yet a general recognition of their urgent practical necessity. The isolated and uncombined efforts of individuals can do little. Until the importance of all questions which concern the public health be distinctly acknowledged by the Government, and measures be taken for establishing a properly organized system of sanitary administration upon uniform principles, we shall arrive at no satisfactory results.

This is not the proper place for entering into further details regarding this subject, but we believe that there would be little difficulty and little expense in carrying out measures, which, although they might not be complete, would nevertheless be of the highest present utility, and which would serve as the commencement of a work the benefit of which would go on constantly increasing. Throughout the whole of Northern India, not only in our Military and Civil stations, but in the Native cities and villages, machinery already exists which might be made available for the collection of the facts which form the basis of sanitary knowledge. To a great extent it is even true that the money necessary for carrying out practical measures of sanitary improvement is ready also. The municipal and local funds that are actually available for such purposes are very considerable, and they are capable, under proper management, of being largely increased, without any pressure upon any class of the community, and without the introduction of any new system of local taxation.

Whatever expenditure it might be necessary for the Government to incur in turning to useful account the means which already exist, and in establishing a comprehensive system of sanitary administration, there can be no doubt that, putting aside all other considerations, such expenditure, if judiciously conducted, would be in reality an absolute economy of money. It cannot be too constantly borne in mind that the rate of mortality among our European Soldiers in India has hitherto been more than six times as great as it is among Englishmen of the same ages at home.\* The average rate of mortality from Cholera alone is actually

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\* *Note by the President of the Commission, 1864.*

The rate of mortality during the last five years has been much lower than this, and there seems every reason for hoping that the improvement will be permanent.



higher than that which prevails in England from all causes of every kind. It may be asserted without hesitation that at least half of the present mortality of the Army is due to causes which might be prevented. The constant waste of money is enormous which this constant waste of life entails.

With regard to Cholera in particular, there is no apparent reason why means may not hereafter be discovered for its prevention, as effectual as those which we already possess for the prevention of small-pox. Although we cannot say that any measures which the Government of this country could undertake would probably lead to this result, there is nothing unreasonable in the hope that they might form one step towards it. This at least we may confidently believe, that it is even now in our power, by help of the means which Sanitary Science affords us, to place an effectual check upon the destructive Epidemics which at short intervals commit such havoc among our Soldiers and among the people of India.

525. In conclusion we may re-capitulate the principal conclusions which we have formed, and the measures of precaution which we recommend the Government to adopt.\* We are of opinion :—

Re-capitulation.

That wherever during the late Epidemic an excessive mortality occurred among the European Troops, it was obviously due to causes which might have been avoided ; that it is in our power, in a great measure at least, to prevent such needless aggravation of the disease in future ; that measures of general sanitary improvement, although urgently required, will not be alone sufficient, but that measures having a special applicability to Cholera are also necessary ; that in the uniform character of the facts which Epidemics of Cholera in Northern India present, we may find a sound basis for special measures of prevention.

That we must assume that the attack of Cholera is always imminent ; that vigilance must be constant ; and every preparation made in anticipation of the outbreak of the disease.

That outbreaks of Cholera being seldom simultaneous in different places, notice of the appearance of the disease in any station must be immediately sent by Telegraph to the neighbouring Divisions of the Army ; that the Civil Authorities must be held responsible for communicating to the Military Authorities information of the appearance of Cholera among the Native population within their jurisdictions.

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\* The modifications in these rules which have been made by the Sanitary Commission for Bengal must be borne in mind. It has not been considered necessary to refer to them again.

That when an attack of Cholera is apprehended at any station, every ordinary sanitary precaution must be taken, but that this is not a proper time for attempts at improvement which involve the stirring up of possible sources of disease ; that measures must at such times be taken for paying the most vigilant attention to the health of the men in barracks, and for treating there all slight cases of diarrhœa and other disease.

That the constant tendency of Cholera is to localize itself in particular places, and among particular bodies of men, and that every effort must be made to turn this fact to useful account, by the immediate abandonment of infected places, and by avoiding all unnecessary communication with them.

That in anticipation of the necessity of placing the Troops under canvas, suitable places must be selected beforehand at every station for encampments, special regard being had to the fact that it will ordinarily be during the rainy season that the encamping-grounds will be required ; that when in the vicinity of any station, buildings suitable for refuges exist, they should also be made available for the temporary occupation of Troops ; that very little or no permanent charge to Government need be incurred on account of these encamping-grounds and buildings, but that such expenditure as may be absolutely necessary for placing them in a sufficiently good condition, and for keeping the approaches to them in sufficiently good order, should be sanctioned ; that a careful record should be kept at every station, showing the situation and extent of available accommodation at every such encamping-ground or building.

That the removal of Troops during the prevalence of Cholera to places at short distances from the Cantonments will usually be as useful as to places further off ; but that the Railways may be extremely valuable in moving men from one healthy station to another, through an intervening tract of country infected with Cholera.

That measures should be taken to ensure the provision of an adequate supply of camp equipage at each station.

That the Civil Authorities should be desired to give every assistance in their power in all matters connected with the supply of carriage and the march of Troops during these emergencies.

That whenever a case of Cholera occurs in any building occupied by European Troops, the room or portion of the building in which it occurred must be immediately vacated ; its inmates removed to other buildings or tents, and separated from the men among whom the disease has not shown itself ; that the vacated building must be thoroughly cleaned and purified, as well as all latrines, urinaries, and wash-houses

attached to it; that it must not be re-occupied until ten days have elapsed, and until all measures of purification have been carried out.

That if Cholera appear in an epidemic form, the particular body of men attacked by it must instantly be sent into camp ; that no deviation from this rule should, under any circumstances, be allowed ; that it should be left to the local Authorities to decide whether this minimum of precaution is sufficient, or whether the removal of Troops from the station who have not actually been attacked by Cholera is also necessary.

That when the weather is wet, cots must be taken into camp for all the men.

That all possible precautions must be taken, both in the Cantonments and camps, to ensure a supply of water free from all suspicion of organic contamination.

That when Troops are sent into camp on account of the prevalence of Cholera, the necessity or otherwise of further movements must be left to the discretion of the local Authorities, but that under no circumstances must the Troops be allowed to turn to Cantonments until at least ten days have elapsed after the disappearance of Cholera from the station ; that communication must, as far as possible, be stopped between the camps and Cantonments, and with all places supposed to be infected with the disease ; and that communication with the hospitals in particular must be prevented.

That when Troops are sent into camp, all buildings occupied by them in Cantonments must be thoroughly cleaned and purified, and that until this has been done, the buildings must not be re-occupied.

That the ordinary system of treatment in hospitals is entirely inapplicable during Epidemics of Cholera, and that its evident result is the aggravation of the virulence of the disease.

That during the prevalence of Cholera, or when an outbreak of the disease is apprehended, every effort must be made to prevent the accumulation of men in the hospitals ; that all slight cases of disease must, as far as possible, be discharged, and treated in barracks or not at all ; that a systematic and vigilant inspection of the men in barracks must be carried out by the Medical Officers, with the object of discovering and treating all slight premonitory symptoms of disease, without sending the men to hospital ; that a temporary hospital should be formed for the treatment of cases of Cholera, entirely separate from the regular hospital.

That no patient attacked by Cholera should, under any circumstances, be placed in the same ward with patients suffering from other diseases.



That if a patient in hospital under treatment for another disease be attacked by Cholera, the ward must be immediately vacated ; that if more cases occur among the patients, the hospital must be abandoned altogether, or reserved for the reception of cases which are considered hopeless.

That when Troops are sent into camp, all ordinary sick capable of being moved must go into camp also, separate hospitals being formed for each camp.

That the Troops should be broken up into as many separate detachments as may be practicable ; that prevention of Cholera is possible, while medical treatment is almost useless after virulent symptoms have appeared ; that, therefore, the difficulty of affording medical treatment is no reason for the neglect of any measure of prevention.

That no permanent increase to existing Hospital Establishments is necessary ; that the local Authorities already possess sufficient power of making such temporary additions as are required ; but that the full authorized establishments should always be maintained.

That no leave of absence, except on medical certificate, should be granted to any Medical or other Officers during the prevalence of Cholera.

That every effort must be made to prevent the employment of European Soldiers on hospital duty during Epidemics of Cholera ; and that Native servants be engaged for the purpose, increased pay being given when necessary.

That female nurses should, if possible, be obtained for attendance on women and children.

That the utmost care should be taken, during the prevalence of Cholera, for the preservation of cleanliness, and in particular, for the immediate removal of all Cholera excreta to places specially set apart for the purpose ; that chemical disinfectants should be freely used on all occasions in which their employment is indicated ; that all bedding and clothing used by Cholera patients should be immediately burned.

That more complete arrangements should be made for the removal of the sick to the hospital, and that separate means should be made provided for carrying the dead to the grave.

That during the prevalence of Cholera, funeral parties should be discontinued.

That every effort should be made, during the prevalence of Cholera, to relieve the men from needless fatigue and exposure, and to encourage every measure likely to promote their general health, their amusement, and occupation.



That hospital comforts should be supplied in barracks, during the prevalence of Cholera, when the Surgeon and Commanding Officer think proper.

That the principal Medical Authorities should be desired to prescribe appropriate rules regarding the preparation of Returns of Cholera cases, so that the Returns from one place may be fairly comparable with those of another.

That no measures for the prevention of Cholera or other disease can be complete, until a proper system of sanitary administration be organized, which may afford the means of obtaining an insight into the Laws upon which public health in India depends, and which may enable the Government to supervise, upon uniform principles, the practical measures of sanitary improvement which are required.

JOHN STRACHEY, *Civil Service.* PRESIDENT.

J. McCLELLAND, *Inspector General* } MEMBER.  
*of Hospitals.*



## ORDERS OF THE GOVERNMENT OF INDIA,

No. 11.

To

THE ADJUTANT GENERAL.

Military Department.

SIR,

I am directed to transmit two copies of the pamphlet noted in the margin, which contains the recommendations of the Cholera Commission, modified in some few particulars by the Bengal Sanitary Commission, which have all been approved by the Government of India; and I am to request that His Excellency the Commander-in-Chief will cause the rules and measures of precaution, &c., therein laid down to be strictly attended to, and promptly and carefully carried out, by the Military Authorities in communication, when necessary, with the Civil Authorities.

2. Copies of the pamphlet, for free distribution to Civil Officers and others as may be deemed necessary, will be sent to the local Governments and Administrations, who will be requested to issue such instructions as will ensure the hearty co-operation of the Civil Authorities in all those measures in which their aid will be needed, especially in those adverted to in paras. 455 and 472. With regard to para. 472, they will be requested to cause it to be pointed out to the local Civil Authorities that the loss even of a few hours in moving Troops away from a station may sometimes lead to most serious consequences; and that occasions of outbreaks of cholera are emergencies in which they must use every lawful means to prevent delay in obtaining carriage for the Troops.

3. The Commander-in-Chief will observe that paras. 460 to 469 refer to a question of great importance, viz., the selection of encamping grounds, respecting which much has been already done under His Excellency's orders. Adverting to the care necessary in selecting proper sites, and to the fact that this can only be properly done during those days in the rainy season when sudden and heavy falls of rain afford ready and reliable proof as to the real suitability of any spot for a cholera camp,

the Right Hon<sup>ble</sup> the Governor General in Council is of opinion that the local Governments and Administrations should be requested to appoint a Civil Officer at each station to make the necessary inquiries as to the best sites for the Camps, and to examine and select such as may appear the most eligible in conjunction with the Officer of the Quarter Master General's Department attached to the Division or District. The Civil Officer's report to the local Government on each site should be communicated to the Officer commanding the Station, and be submitted to the local Government with any remarks he may desire to make thereon.

4. The local Governments will accordingly be requested to issue the necessary orders on this point with the least possible delay, and to cause a full report in detail, accompanied by a sketch map on the scale of 5,000 feet to an inch, on which should be recorded the information referred to in para. 468, to be submitted as soon as the selection has been finally made at any station, and a copy of the same, when approved, to be transmitted to this Office for the information of Government and for communication to the Bengal Sanitary Commission. These plans can, it is believed, be furnished with little difficulty, and at no extra expense, by the Officer belonging to the Revenue Survey Department.

5. It is scarcely necessary to observe that the recommendations for the removal into camp of the greater portion of all the Troops, when deemed necessary on sanitary grounds, must be acted upon with a due regard to Military considerations ; and the orders of Government will be hereafter communicated respecting the camp equipage which it may be considered expedient to maintain to meet such a possible, though improbable, contingency.

6. The Officiating Principal Inspector General Medical Department will be required to arrange for maintaining the full authorized complement of Medical subordinates, or to suggest such measures as he may deem to be necessary to this end for the consideration of Government. The views of the Government as to the number of Medical Officers required for service in India have long since been submitted to Her Majesty's Government.

7. He will also be asked for any suggestions which he may think necessary with advertence to para. 519 ; though it is believed that proper arrangements, quite within the competency of the local Military and Medical Authorities to make, would suffice to provide sufficient coolies for the sick in any emergency, and to prevent the misuse of them noticed



by the Commission. As regards hearses, I am to request that Government may be favored with the Commander-in-Chief's opinion as to the expediency of any increase to the scale laid down in General Order by the Commander-in-Chief dated 5th November 1861, or of maintaining any proportion of surplus hearses at stations.

8. The special attention of the Officiating Principal Inspector General Medical Department will be drawn to para. 523, and he will be requested to suggest definite rules for preparing returns of cholera cases, in order as far as possible to avoid the inconvenience noticed by the Commission as having arisen from the very different views held by Medical Officers as to what really constitutes a case of cholera. His suggestions when received will be sent to you, in order that, with the permission of the Commander-in-Chief, Government may be favored with the opinion of the Inspector General Her Majesty's Hospitals on the subject.

9. The recent appointment of Sanitary Commissions in the three Presidencies has, it may be noticed, provided for the introduction of some of the measures adverted to as most important and necessary in para. 524.

10. His Excellency will at once perceive how necessary it is, both on financial and sanitary grounds, that the Military and Medical Officers, to whose judgment the adoption of the various measures recommended must necessarily be left, should be required to exercise a sound discretion in the matter: so that whilst everything may be unhesitatingly done which the health of the Troops may seem to require, unnecessary expense may not be incurred through hastiness and want of due consideration. The Governor General in Council relies on His Excellency's exercising, in the interests both of the State and the Soldier, a watchful superintendence over the operation of the rules now laid down.

11. In conclusion I am to request as early an intimation as possible of the number of copies which His Excellency the Commander-in-Chief will require for the use of the Departments at Army Head Quarters, and for distribution to stations, &c., in order that the number required may be printed off.

|                                   |   |                                                                               |
|-----------------------------------|---|-------------------------------------------------------------------------------|
| SIMLA;<br>The 1st September 1864. | { | I am, &c.,<br>(Signed) H. W. NORMAN, Colonel,<br>Secy. to the Govt. of India. |
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No. 12. To the Secretary to the Government of Bengal.

No. 13. To the Secretary to Government, North-Western Provinces.

- No. 14. To the Military Secretary to the Government of the Punjab.
  - No. 15. To the Chief Commissioner, Oude.
  - No. 16. To the Chief Commissioner, Central Provinces.
  - No. 17. To the Officiating Principal Inspector General Medical Dept.
  - No. 18. To the Commissary General.
  - No. 19. To the Inspector General of Ordnance.
  - No. 20. To the Secretary to the Govt. of India, Public Works Dept.
  - No. 21. To the Secretary to Govt., Fort St. George, Military Dept.
  - No. 22. To the Secretary to Government, Bombay, Military Department.
  - No. 23. To the President Sanitary Commission.
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## APPENDIX.

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*Memorandum on the propagation and prevention of Asiatic Cholera, by*  
W. BUDD, ESQ., M. D., *Edinburgh, Senior Physician to the Bristol*  
*Royal Infirmary, communicated to the Commission through the Inspector*  
*General of Her Majesty's Hospitals.*

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The conclusions to which I have been led regarding the spread of Asiatic Cholera may be stated in few words.

In their most general expression they are summed up in the two following propositions :—

1st.—That the disease is essentially contagious or communicable ; and 2nd.—That it is disseminated (as I believe exclusively) by the liquid discharges from the intestinal canal of Cholera patients.

To understand clearly the power of a disorder, spreading in the way here assumed, to affect such large numbers of persons as those who suffer in a Cholera Epidemic, it is necessary to bear in mind, the one great characteristic of the group of contagious poisons which give rise to acute diseases. I speak of the enormous multiplication which these poisons undergo in the living body as a result of the morbid process they set up. It is, in fact, this multiplication, and the disturbance attaching to it, that in each case constitutes the disease and destroys life.

In small-pox the work of reproduction is seen in results directly appreciable to the eye. The practice of inoculation has shown, by numberless instances, that, under certain conditions, a perfectly impalpable speck of the small-pox virus inserted into the skin may produce a disease, which, in the course of a few days, issues in the development of a new stock of the same virus, sufficient in amount to inoculate with small-pox myriads of other persons.

Although the fact is not open to evidence of the same precise order, yet I believe it to be equally sure, that in every case of Asiatic Cholera the Choleraic poison is multiplied in a ratio at least as great.

Cast off by the intestine of the Cholera patient, in the characteristic rice-water discharge, this poison may be transmitted to other and uninfected persons in the following principal ways :—

1st.—By the soiled hands of attendants on the sick, a mode of communication which is probably very common within the limits of the family circle.

2nd.—By means of bed and body linen, and other articles, tainted with the rice-water discharges ; and

3rd.—Through the medium of the soil.

As the discharges are liquid, the great bulk of them necessarily find its way to the ground. Thus deposited, the poison may take effect,—(a) by rising into the air with the products of evaporation ; (b) by percolating into the drinking water ; and lastly, by atmospheric dispersion, in the form of impalpable dust, after it has passed into the dried state.

That the disease may be communicated by poison in this last form is perhaps difficult to establish by direct proof. But in default of this, the case is one in which the evidence furnished by analogy is so close and weighty as to leave no reasonable doubt of the fact.

We know *by experiment* that other contagious poisons, (the vaccine the variolous, and the woorara poison, for example,) when dried, retain their properties in a dormant state for indefinite periods of time, recovering them entirely when moistened. We know by evidence, almost as certain as that of experiment, that the same is true of the poison of scarlet-fever, of that of malignant pustule, &c, &c. It would be contrary to all probability that it should fare otherwise with the Cholera poison ; and in fact, in the numerous and well authenticated instances of infection, conveyed by articles of clothing, this poison, during its transport, must necessarily have been in many in the dried state. As this state is one which entirely protects organic bodies from molecular change, there would seem to be no definite limit to the time during which the morbid agent, having once passed into it, might retain its specific powers. If the foregoing premises be admitted, certain consequences may at once be deduced from them, which it is all important to note.

From the enormous multiplication which the poison undergoes in the living body on the one hand, and from the nature of its various modes of far-reaching distribution on the other, two things must necessarily follow. The first is, that, under given conditions,—and conditions that must often really happen,—a single case may give rise to a wide-spread infection ; and, secondly, that as cases multiply, it must, in numberless instances, be as impossible to trace their linear succession as it would be to trace that of particular generations of fungi or infusoria. In both examples, in fact—in the disease as well as in the living organism,—the organic germs are disseminated, not only through the same media, but in the same modes, and by the same agencies. The necessary result is, that in both new specimens must be constantly springing up, whose



direct parentage it is impossible to trace; and under circumstances which to those who have not the key to the events, bear all the semblance of spontaneous origin. When matters have come to this pass, it is obvious that the diffusion of the disease will, for the most part, occur in an order entirely different from that to which the idea of contagion is commonly attached.

To apprehend clearly the course of events in a Cholera Epidemic, another element must be taken into account, namely, the extreme shortness of the period of incubation. In most other acute contagions, the average duration of this period is a fortnight or more: in Cholera it seldom exceeds three days, and were the disease is virulent, there is evidence to show that it may not exceed twice that number of hours. Hence the proportionately greater rapidity with which Cholera extends itself through an infected community.

The relative share which the various modes of dissemination here indicated take in the propagation of the pestilence must vary with season and climate; with temperature; with the habits of the people; the nature of the soil; with that of the water supply, and other sanitary arrangements. From what I can learn of Indian habits and of the arrangements which prevail in India, in regard to drinking water, it seems probable that in that country water contamination plays a very important part in it. In particular, there seems to be reason to believe that the use of water, infected with Choleraic germs, is answerable for the sudden outbreaks of the disease, which have sometimes been observed in bodies of Troops on march, and in which large numbers of men have been struck down almost at once. On the other hand, from the rapidity with which the rice-water discharges must often pass into a dry state, under the burning rays of a tropical sun, it seems highly probable also, that in India "Cholera dust," If I may use such an expression, has a large share in the work of propagation. As in most places where the disease prevails some germs must almost necessarily remain in a state of desiccation, it is easy to see how every Epidemic may leave behind it in a dormant form the seeds of a new outbreak co-extensive with the first.

The evidence which has led me to these various conclusions has been in part already published in a series of letters addressed to the Association Journal in 1854-55. Of these letters, I have the honor to forward an abstract, in the form of a communication to the Edinburgh Medical Journal, by the late Professor Alison, "on the communicability of Cholera by dejections." Since that date I have collected a great

body of additional evidence to the same effect, which, I hope, in the course of time, to make public.

Meanwhile, it may be readily shown that the foregoing views explain, in the most natural way, almost all the leading facts which characterize the diffusion of this pestilence. They explain, in the first place, its relation to filthy habits and defective drainage; its predominance in low levels; its striking tendency to follow the natural line of watershed; and its communication to persons, who not only have never been in the presence of the sick, but who are stationed at a distance from them. If these views be just, the disease may be described, in general terms, as "a disease which infects the ground." It is impossible to look at any of the maps which have been constructed to represent particular Cholera outbreaks without at once recognising this characteristic. In all such maps, in addition to the "dots" which mark the occurrence of cases in single order, there are others which lie in such thick clusters as to look like a stain on the paper. These clustered dots always occur where drainage is either defective or absent, and the stain on the map corresponds to, and is the expression of, a miasmatic stain of the soil by the liquid poison.

In addition to these, some other circumstances of a very special kind have been observed in particular outbreaks, in which the coincidence between theory and fact is still more striking. Among these, perhaps the most remarkable relate to cases of public establishments for the reception of large numbers of both sexes, and in which the disease, in a particular outbreak, has been entirely confined to one sex. Many instances have happened in which, of large bodies of men and women, living under the same roof, eating the same food, drinking the same water, and breathing the same air,—sometimes, indeed, with only a partition-wall between them,—one sex has been decimated by Cholera, while the other has remained entirely exempt. The whole of this strange result may be accounted for by the fact that, in almost all such establishments, there is one common privy for either sex, which is devoted to its exclusive and separate use. The contamination of this privy by the rice-water discharges of the first casual case explains at once the whole mystery. The force of this example is the greater, because, under any other view, the fact appears to be entirely inexplicable.

The operation of tainted privies, in disseminating the disease in work houses, prisons, barracks, and other public establishments, is pointed out in one of the extracts which Professor Alison has given from my letter, in terms to which I have nothing to add.

The theory that Cholera is disseminated by the dejections, seems also to be remarkably confirmed by the way in which its prevalence is related to rain-fall.

In Europe all the great Epidemics have occurred, as we should have expected them to do, in times of prolonged drought. Rain, by diluting the poison, and by giving rise to floods which rapidly sweep it beyond the inhabited area, seems to have a powerful influence in checking the disease. But to have this effect, the rain-fall must be heavy and continuous. There are many conditions under which it is readily conceivable that light and intermittent rains may, on the contrary, favor its spread. I have not yet completed my study of the history of Cholera in India, but I believe I am right in assuming that there also the seasons of great Epidemics have generally been dry seasons.\* Whether the cessation of the recent Epidemic, on the occurrence of the great floods which immediately succeeded to it, be more than coincidence, the details given by the papers do not enable me to Judge.

Before concluding this part of the subject, there is one other peculiarity of the Cholera poison on which I desire to say a few words, as its recognition is essential to a clear understanding of some of the anomalies attaching to Cholera outbreaks, which have most perplexed Medical observers. I speak of the tendency of the poison, when in a moist state, to rapid, spontaneous decomposition.

In one of my letters to the Association Journal, in 1854, after entering into some speculations as to the actual nature of the morbid agent, I expressed myself in the following words :—

“ But if we are still in ignorance of the actual nature of the agent, there is one of its distinguishing properties about which there can be no mistake. I speak of its natural tendency, except under special conditions, to rapid decay and extinction. I have already drawn attention to the extraordinary rapidity of its development,—a rapidity unexampled in the case of any other contagious poison. Its tendency to decay appears to be rapid and unexampled in the same proportion. This is no more than we should have expected. Through the whole of organic nature, rapid growth and rapid decay are, of necessity, correlative terms.

“ What we should have concluded, as to this property of the Choleraic poison, as a matter of inference, is seen as a matter of fact on every hand wherever Cholera breaks out. Its consequences are exemplified in a thousand forms : broadly, in the short duration and rapid subsidence of particular Epidemics ; and less broadly, but not less plainly, in the rapid disappearance of the disease in courts and other localities where it had lately raged, and where a large prey had seemed still to invite its deadly attack ; yet more specifically in the rapid, spontaneous disinfection of infected linen, of which many striking instances might be recorded, to say nothing of numberless other facts to the same purport. It seems to be certain, in fact, that where the stock of poison is not renewed by renewed development

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(Note by Commission.)

\* Vide Report, Sec. II., paras. 334 to 354,



in the bodies of living men, it cannot long subsist in the common conditions of the English climate. This is, no doubt, a reason why, although Cholera has made great havoc among us in certain favorable seasons, it has failed to establish itself permanently here. In India—The native home of the disorder—the atmospheric conditions appear to be more favorable to the preservation of the powers of the poison; partly, most probably, from the higher temperature of the climate; partly, too, from the operation of circumstances, which must often cause the poison to pass rapidly, immediately on its elimination from the human body, into the dried state.

“It is from not having recognised its great destructibility, and rapid tendency to decay, as the special and distinctive character of the Choleraic poison, that physicians have been led to draw inferences from facts such as those just referred to, which the facts themselves by no means warrant.”

These considerations (although they might, no doubt, have been better expressed,) I believe to be perfectly just. The powers of all the contagious poisons appear to be due to their being in an active state of metamorphosis, and to be proportioned to its intensity in each particular case. Where the conditions necessary to re-production are present, a rapid multiplication of the poison is the result; where they are absent, an equally rapid destruction of the original stock. The cells of yeast, when placed in a simple saccharine solution, enter into fermentation, and speedily perish. But if the same cells be placed in a similar solution, but one which contains as well the nitrogenous elements for their growth, the very same metamorphosis which led, in the former case, to their destruction, leads now to the development of a new brood.

Under this view, as applied to Cholera, the shortness of incubation, the rapid course of the morbid phenomena, and the rapid subsidence of the disease often observed in infected localities, are circumstances which have their root in a single condition, and are all mutually related. By reference to them, many of the peculiarities which distinguish Epidemics of Cholera from those of other acute contagions, may be readily explained, which would otherwise remain quite unintelligible.

I do not know whether I am warranted in assuming that the case, of which an outline has here been briefly sketched, is already a strong one on its own grounds. But, in addition to these, it has the support of analogy of no common force.

In every country in Europe, the almost perfect identity of the conditions which promote the spread of Cholera, and of those which are known to promote the spread of typhoid fever, has been made the theme of general remark.

In the Cholera Report of the London Royal College of Physicians this identity, as regards one great class of conditions, is made the subject of a striking and elaborate parallel.



In every successive Epidemic of Cholera which has visited England the burden of the teaching of the English Board of Health has been, that Cholera and typhoid fever are the offspring of precisely the same sanitary defects.

Having this in view, I have ventured to enclose a series of papers by myself on the propagation of typhoid fever, containing evidence to show that the defects in question have the effect ascribed to them, only because this fever is (mainly) disseminated by the discharges from the diseased intestines of already infected persons. In other words, the striking family-likeness between the two diseases, as regards their mode of spreading, is due to the fact that typhoid fever also is "one of the great group of diseases which infect the ground."

It is, I need scarcely add, impossible, within the brief limits of a memorandum, to discuss the various objections which may be taken to the foregoing views. I may, however, state that having, in the course of many years' study of the problem, given my mind much to this aspect of it, I have hitherto met with no objection which would not apply with still greater force to any other mode of accounting for the facts.

I may further, perhaps, be allowed to take this opportunity of observing that where a theory rests on evidence of its own, facts that seem to be opposed to it, although they may possibly require some qualification of it, constitute no valid plea for its rejection.

It is well known, for instance,—to illustrate small things by great ones—that the theory of universal gravitation would never have been established if the minor difficulties which appear to stand in its way at the date of its promulgation had been allowed to prevail against it. The same thing is still more true of the undulatory theory of light. In this last case, indeed, there remain, even now, one or two outlying phenomena, which no one has yet been able to bring within the domain of the theory. That light is propagated by the undulations of an ether is not the less the scientific faith of Europe.

The preventive measures I would venture to suggest for checking the spread of Cholera are directly founded on the conclusions to which I have been led regarding its propagation. Their object would be to destroy, by means of chemical disinfectants, the poisonous properties of the discharges immediately on their issue from the body; and in places where this has been neglected, to remove, if possible, all uninfected persons from the poisoned ground.

The particular methods by which these ends may be accomplished are described in sufficient detail in the paper from the Edinburgh Medical

Journal; and a memorandum in MS. (also enclosed), which I drew up some years ago, at the request of a friend, for arresting the spread of Cholera among Troops in infected barracks.

An important practical difficulty in the way of complete disinfection arises from the circumstance that in the last stages of Cholera the discharges are almost always involuntary. This difficulty may, however, be in great measure got over by placing, under the breech of the Cholera patient, a bag containing a sufficiency of Condry's or McDougall's disinfecting powder, to be changed as often as occasion may require.

In the absence of special disinfectants, a good deal may yet be done by one or two simple measures for limiting the sphere of the operation of the poison. It is an established fact that the noxious powers of animal poisons are destroyed by the temperature of boiling water. In boiling water we possess, therefore, a ready means for the disinfection of soiled linen, bedding, and other tainted articles. By digging a trench in the ground, in a well-chosen spot, for the reception of the rice-water discharges, and by covering each discharge as it is deposited by a layer of earth, these dangerous morbid products may be disposed of in a way that, at any rate, would prevent their having a wide-spread effect.

It may be well to add that these various measures, which are devised for the emergencies of actual disease, are in no wise intended to supersede the necessity for general sanitary improvements.

In all large public establishments there is one thing which should be made an essential part of their internal economy. I refer to the establishment of a separate cloaca for the reception of all discharges from sick persons. If the corresponding water-closet or latrine were provided with self-acting means of disinfection, the security would be all the greater. The contagious diseases which are communicated by exuvia from the intestine are so frequent and so rapid in their course as to leave no doubt that an arrangement of this kind would protect the inmates of such establishments from many a sudden and unforeseen outbreak.

I cannot conclude this memorandum without drawing attention to the very important works on the same subject by the late Dr. Snow. I was led to the principal opinions I hold respecting the propagation of Cholera before the appearance of his first Memoir and on entirely independent grounds. I had also taught, for many years, at the Bristol Medical School, the leading doctrines regarding the propagation of typhoid fever, which are enumerated in the series of papers herewith enclosed. But Dr. Snow was the first to announce publicly that Asiatic

Cholera is disseminated by the rice-water discharges, and to substantiate the statement by evidence which, for my own part, I consider to be perfectly conclusive.

CLIFTON, BRISTOL, }  
4th November 1861. }

W. BUDD.

*Plan for arresting Cholera among Troops in infected Barracks.*

1st.—The Troops to be removed at once, if possible, from the infected barracks, and to be encamped on high ground.

2nd.—All who may be attacked after their removal to be separated from their healthy comrades the moment the first symptoms appear.

3rd.—All discharges from the sick (including those vomited) to be received, on their issue from the body, into vessels containing a saturated solution of chloride of zinc or some other powerful disinfectant.

4th.—The latrines or other places which serve as the final receptacles of these discharges *to be reserved exclusively for that use.*

5th.—All latrines belonging to the camp to be strewed, night and morning, with a mixture of peat charcoal and chloride of lime.

6th.—All tainted linen, bedding, &c., to be burnt immediately after its removal from the sick.

7th.—The hands of all attendants on the sick to be scrupulously cleaned (by means of sand and water containing some disinfectant,) whenever they have become soiled by “rice-water.”

8th.—The utmost care to be taken in providing drinking water; and where any doubt exists as to its quality, the water to be boiled and filtered through charcoal before use.

9th.—The interior of the infected barracks to be fumigated with chlorine or sulphurous acid.

10th.—Existing privies, and the drains connected with them, to be built over, or otherwise abolished, where necessary, after a preliminary disinfection by the free use of chloride of lime or peat charcoal.

11th.—Convalescents to be kept for some time in separation from the healthy Troops.

CLIFTON, }  
November 1861. }

W. BUDD.

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